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EXAMINER

PEREZ, JAMES M

ART UNIT

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2611

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/532,026

Applicant(s)

MORGAN ET AL

Examiner

JAMES M. PEREZ

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 May 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-9 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-4 and 6-9 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 21 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

Detailed Action

This Office Action is responsive to the amendments filed on 5/1/2008.

Currently, claims 1-4, and 6-9 are pending.

Response to Arguments

1. Applicant's arguments with respect to claims 1-4 and 6-9 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the turboequalization system, wherein the blind equalizer is a first stage of the turboequalization system of claim 9 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 4, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki (US 2002/0154690) in view of Kennedy et al. (US 2002/0181576) in further view of Lin et al. (USPN 6,813,325).

With regards to claims 1 and 8, Okazaki teaches a method and receiver for synchronizing symbols at an output of a blind equalizer (figs. 4 and 9: paragraphs 60-63 and 66), and that the receiver and method comprising the steps of:

inserting into a succession of sent symbols, one or more known synchronization sequences of symbols (figs. 4, 5, and 9: paragraphs 5, 15, 60-63, 66, and 68: unique words and data);

detecting said one or more known synchronization sequences in a succession of symbols at the output of said blind equalizer (fig. 4: paragraphs 5, 15, 60-63, 66, and 68);

deducing any shifting of the symbols in the succession of symbols at the output of the blind equalizer from the result of said detection (fig. 4: paragraphs 5, 15, 60-63, 66, and 68); and

retiming the symbols at the output of the blind equalizer (fig. 4: paragraphs 5, 15, 60-63, 66, and 68), as a function of the deduced shift of the symbols (fig. 4: paragraphs 5, 15, 60-63, 66, and 68), between a synchronization sequence for which a shift is deduced and a preceding synchronization sequence (paragraphs 68 and 72-73).

Okazaki does not explicitly teach two Limitations: Limitation 1) on sending, one or more known synchronization sequences of symbols are repeated at regular intervals in said succession of symbols; and Limitation 2) the function of the deduced shift of the symbols by eliminating symbols from or adding symbols to the succession of symbols at the output of the blind equalizer.

Limitation 1)

Kennedy teaches on sending, one or more known synchronization sequences of symbols are repeated at regular intervals in said succession of symbols (paragraphs 27-29).

One of ordinary skill in the art at the time of the invention would clearly understand that benefits of repeating at regular intervals the insertion of at least one known synchronization sequence since such a modification would clearly provide reduced jitter and timing errors of the received signal in a multi-path channel at the receiver, thus repeating synchronization symbol at standard time intervals clearly increases synchronization of the transmitted signal at the receiver. Therefore it would

be obvious to one of ordinary skill in the art the time of the invention to modify the system and method of Okazaki with the teachings of Kennedy in order to improve synchronization at the receiver by reducing jitter and timing errors in the received signal due a multi-path channel.

Limitation 2)

Lin teaches retiming frames by eliminated from or added to the succession of bits between two synchronization sequences (col. 3, lines 45-65; col. 7, lines 9-48; and col. 9, lines 5-32).

One of ordinary skill in the art would clearly understand the benefits of retiming a signal by eliminating or adding bits/symbols to a succession of bit/symbol with reference to two synchronization sequences since such a modification provides a low complexity method of achieving increased synchronization. Therefore in view of KSR, it would be obvious to one of ordinary skill in the art at the time of the invention to modify the system and method of Okazaki with the teachings of Lin in order to yield the predictable results and benefits of a low complexity method of achieving increased synchronization in a received signal that had a timing slip due to blind equalization.

With regards to claim 2, Okazaki in view of Kennedy in further view of Lin teaches the limitations of claim 1.

Okazaki teaches detecting a known inserted synchronization sequence at the output of said blind equalizer (figs. 4, 5, and 9: paragraphs 5, 15, 60-63, 66, and 68: unique words and data).

Okazaki does not explicitly teach detecting a known synchronization sequence inserted, on sending, into a succession of symbols, the symbols at the output of the equalizer are correlated with said synchronization sequence and the resulting correlation peaks are detected.

Kennedy teaches detecting a known synchronization sequence on sending, into a succession of symbols, the symbols at the output of the equalizer are correlated with said synchronization sequence and the resulting correlation peaks are detected (paragraphs 27-30).

One of ordinary skill in the art at the time of the invention would clearly understand that benefits correlating a known inserted synchronization sequence in receiver since such a modification would increase synchronization accuracy (less jitter and time errors) at said receiver especially in a multi-path channel. Therefore it would be obvious to one of ordinary skill in the art the time of the invention to modify the system and method of Okazaki with the teachings of Kennedy in order to improve synchronization at the receiver by reducing jitter and timing errors in the received signal due a multi-path channel.

With regards to claim 4, Okazaki in view of Kennedy in further view of Lin teaches the limitations of claim 2.

Okazaki teaches MLSE equalizer estimates an amplitude, a phase, and a delay time of a signal that arrives with a time variance based on a multi-path propagation by using known series called a unique word at the receiver side (paragraph 4).

Okazaki does not explicitly teach the result of said correlation is used to determine information on the phase of the signal carrier that carries the received symbols and that information is used to resolve ambiguity as to the phase of the symbols at the output of the equalizer.

Kennedy teaches detecting a known synchronization sequence on sending, into a succession of symbols, the symbols at the output of the equalizer are correlated with said synchronization sequence and the resulting correlation peaks are detected (paragraphs 27-30). One of ordinary skill in the art would clearly understand using the correlation of the unique word to determine information on the phase of the signal carrier that carries the received symbols and that information is used to resolve ambiguity as to the phase of the symbols at the output of the equalizer, since such a modification is common and well-known in the art and has the known benefits of increase an equalizers ability to mitigate ISI (inter-symbol interference) due to a multi-path propagation channel. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention to modify the system and method of Okazaki with the teachings of Kennedy in order to improve synchronization at the receiver by reducing jitter and timing errors in the received signal and interference due a multi-path channel.

With regards to claim 6, Okazaki in view of Kennedy in further view of Lin teaches the limitations of claim 1.

Okazaki teaches retiming the symbols at the output of the blind equalizer (fig. 4: paragraphs 5, 15, 60-63, 66, and 68), as a function of the deduced shift of the symbols

(fig. 4: paragraphs 5, 15, 60-63, 66, and 68), between a synchronization sequence for which a shift is deduced and a preceding synchronization sequence (paragraphs 68 and 72-73).

Okazaki does not explicitly teach said symbols are eliminated just after the synchronization sequence preceding the synchronization sequence for which a shift is detected.

Lin teaches retiming frames by eliminated from or added to the succession of bits between two synchronization sequences (col. 3, lines 45-65; col. 7, lines 9-48; and col. 9, lines 5-32).

One of ordinary skill in the art would clearly understand the benefits of retiming a signal by eliminating or adding bits/symbols to a succession of bit/symbol and said symbols are eliminated just after the synchronization sequence preceding the synchronization sequence for which a shift is detected since such a modification provides a low complexity method of achieving increased synchronization. Therefore in view of KSR, it would be obvious to one of ordinary skill in the art at the time of the invention to modify the system and method of Okazaki with the teachings of Lin in order to yield the predictable results and benefits of a low complexity method of achieving increased synchronization in a received signal that had a timing slip due to blind equalization.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki (US 2002/0154690) in view of Kennedy et al. (US 2002/0181576) in further view of Lin

et al. (USPN 6,813,325) as applied to claim 2 above, further in view of Peon et al. (USPN 7,027,499).

With regards to claim 3, Okazaki in view of Kennedy in further view of Lin teaches the limitations of claim 2.

Okazaki does not explicitly teach the detected correlation peaks are compared to a given threshold and the symbols are not retimed unless a peak higher than said threshold is detected.

Peon teaches the detected correlation peaks are compared to a given threshold and the symbols are not retimed unless a peak higher than said threshold is detected (col. 4, line 45 through col. 5, line 29).

Therefore it would be obvious to one of ordinary skill at the time of the invention to combine the synchronization method and system of Okazaki in view of Kennedy with the corrective action correlation and threshold logic of Peon in order to reduce the power consumption of a digital system and increase synchronization accuracy and convergence.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki (US 2002/0154690) in view of Kennedy et al. (US 2002/0181576) in further view of Lin et al. (USPN 6,813,325) as applied to claim 1 above, further in view of Labat (USPN 5,909,466).

With regards to claim 7, Okazaki in view of Kennedy in further view of Lin teaches the limitations of claim 1.

Okazaki does not explicitly teach the blind equalizer has a switchable structure, uses a switchable algorithm, and, in a convergence mode of operation, includes in cascade a purely recursive whitening filter and a matched transversal filter that is reinitialized as a function of the performance of the equalizer.

Labat teaches the method characterized in that the blind equalizer has a switchable structure, uses a switchable algorithm (col. 6, lines 23-45), and

in a convergence mode of operation, includes in cascade a purely recursive whitening filter and a matched transversal filter that is reinitialized as a function of the performance of the equalizer (col. 6, line 49 through col. 7, line 49).

Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to combine the synchronization and blind equalization system and method of Okazaki with the adaptive blind equalizer circuit of Labat since such a modification has the known benefits of improved convergence and tracking, and improved adaptation to channel fluctuations in severe situations (Labat: col. 5, lines 1-15).

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki (US 2002/0154690) in view of Kennedy et al. (US 2002/0181576) in further view of Lin et al. (USPN 6,813,325) as applied to claim 8 above, further in view of Laot (Turbo Equalization: Adaptive Equalization and Channel Decoding Jointly Optimized).

With regards to claim 9, Okazaki in view of Kennedy in further view of Lin teaches the limitations of claim 8.

Okazaki teaches a equalization system wherein the blind equalizer is the first stage of the system (figs. 4 and 9: elements 202 and 402).

Okazaki does not explicitly teach a turboequalization system, wherein the blind equalizer is a first stage of the turboequalization system.

Laot teaches a receiver characterized in that it includes a turboequalization system of which an equalizer in a first stage (fig. 1 and 2: page 2 whole).

Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to modifying the synchronization and blind equalization system and method of Okazaki with the turboequalization receiver method of Laot since such a modification has the known benefits of drastically reducing inter-symbol interference in the received signal (Laot: abstract).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **JAMES M. PEREZ** whose telephone number is (571)270-3231. The examiner can normally be reached on Monday through Friday: 9am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James M Perez/
Examiner, Art Unit 2611
8/28/2008
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